

CINC 21 Advanced Concept Technology Demonstration

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OVERVIEW

Commander-in-Chief for the 21st Century (CINC 21) was a Fiscal Year 2000 (FY 00) new-start Advanced Concept Technology Demonstration (ACTD). The Joint Requirements Oversight Council (JROC) approved CINC 21 on 11 February 2000, and Congressional approval followed on 13 March 2000. The program consists of 3 years of development and integration and 2 years of residual support and transition.

CINC 21's mission is to develop and assess new command and control concepts for improving the speed and effectiveness of joint, coalition, and inter-agency operations by leveraging advances in visualization, knowledge management, information management, and network technologies.

CINC 21 directly addresses the emphasis that Joint Vision 2010 (JV 2010) places on Information Superiority and Decision Superiority. JV 2010 describes Information Superiority as the ability to collect, process, and disseminate an uninterrupted flow of information while exploiting or denying adversaries' ability to do the same. However, Information Superiority, while necessary, is not sufficient. Success in any operation requires the ability to effectively use and quickly exploit information. JV 2020 refers to this ability as Decision Superiority and states "... creation of information superiority is not an end in itself...we have a competitive advantage only when it is effectively translated into superior knowledge and decisions."

Specifically, CINC 21 will address Decision Superiority by: improving the ability of the CINC's "extended" staff to track and manage multiple, simultaneous crises; enabling synchronized understanding of operations between CINCs and the commanders of joint task forces; instituting enhancements to the information infrastructure to match operational needs (including coalition and interagency needs); and increasing the speed of command decision-making to gain and maintain the strategic advantage. Table 1 lists the lead organizations executing CINC 21.

The CINC 21 team concluded the first year of the development program in October 2000 by conducting a successful major demonstration at United States Pacific Command (USPACOM) headquarters. The primary audience for the demonstration included the directors of each staff component; the Deputy CINC, LT Gen Case; and the Deputy Chief of Staff, MG Lowe. Based on the success of this demonstration, the development team adopted a model of delivering technology, configured in operational packages, in a development cycle of 4-month increments. Spiral I was approved in February 2001, with delivery of the technology scheduled

ABSTRACT

This paper describes an Advanced Concept Technology Demonstration (ACTD) entitled Commander-in-Chief for the 21st Century (CINC 21) and documents the involvement of SSC San Diego personnel in the ACTD. The goal of the ACTD is to create a highly visual, dynamically updated capability to develop and understand the CINC's theater situation, plans, and execution status during multiple, simultaneous crises involving joint, coalition, and humanitarian agencies based on shared knowledge and collaboration across secure and optimized networks. The paper describes operational needs and focuses on the application of technologies in specific areas. CINC 21 is a 5-year program consisting of 3 years of "development and integration" and 2 years of "residual support and transition."

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for mid-May 2001. The first major Military Utility Assessment (MUA) opportunity for CINC 21 ACTD delivered under the spiral development process will take place during Exercise KERNEL BLITZ (Experimental) (KB (X)) in June 2001. Subsequent development spiral deliveries will occur in September 2001, January 2002, and May 2002. Other MUA events are currently undetermined, but the culminating "graduation event" will be scheduled for a USPACOM Exercise in the fourth quarter of FY 02.

FY 03 and FY 04 are transition years consisting of three major activities:

1. Providing operations and maintenance (O&M) support for leave behind/residual capabilities,
2. Continuing transition planning with acquisition sponsors and programs of record,
3. Continuing assessments for the Defense Information Infrastructure Common Operating Environment (DII COE) and modifying applications as necessary to meet compliance requirements.

Objectives

Detailed objectives for the ACTD are stated in the CINC 21 Implementation Directive. U.S. Commander in Chief, U.S. Pacific Command (USCINCPAC) defined Critical Operational Issues (COIs). Table 2 shows the relationship between the COIs and the CINC 21 objectives.

Concept of Operations (CONOPS)

At the center of CINC 21's Concept of Operations (CONOPS) is a knowledge-enabled information sphere with tools and applications that will improve situational awareness and understanding, provide the ability to collaborate as necessary, and manage the information enterprise while transforming and accelerating the decision processes that support the management of crisis-contingency operations, the CINC's theater engagement policy, and supporting staff processes.

The CONOPS for crisis operations includes expanding the

TABLE 1. Participating organizations.

Deputy Under Secretary of Defense for Advanced Systems and Concepts (DUSD [AS & C])	ACTD Oversight Dr. Robert Popp
U.S. Pacific Command (USPACOM)	Operational Manager Mr. Randall Cieslak
Office of Naval Research	Technical Manager Dr. Sue Hearold
Defense Information Systems Agency	Deputy Technical Manager LTC Riki Barbour
Space and Naval Warfare Systems Command (SPAWAR)	Transition Manager Mr. John Quintana

TABLE 2. Objectives and critical operational issues.

Objectives	Critical Operational Issues
<ul style="list-style-type: none"> · Improve situational awareness and understanding through <ol style="list-style-type: none"> a) shared understanding of operational situation, b) scaleable and tailorable visualization, c) advanced decision support and knowledge management tools. 	<ul style="list-style-type: none"> · Can advanced visualization technology empower individuals to process, digest, and assimilate large volumes of information, thereby enabling faster, more effective decisions? · Can knowledge management technology integrate information, context, and rules to increase understanding and, therefore, improve decision-making?
<ul style="list-style-type: none"> · Demonstrate and synchronize distributed decision-making, collaboration, and information management/information dissemination tools among joint, coalition, inter-agency, and non-governmental organization partners. 	<ul style="list-style-type: none"> · Can collaboration tools be used to overcome the tyrannies of time, distance, and system disparity?
<ul style="list-style-type: none"> · Enable command of the information enterprise through advanced enterprise management tools and user-specified and prioritized operational products. 	<ul style="list-style-type: none"> · Can the collection of networks, databases, and applications be enhanced to optimize the flow of information, with security assurance, across multiple network enclaves?

ability of warfighting CINCs to handle multiple crises by delegating planning and execution to distributed crisis management cells and by simplifying the information flow to CINC and Commander, Joint Task Force (CJTF) decision cells. A combination of intelligent information management and continuous collaboration with multiple crisis cells will accomplish this task. Benefits will accrue to the CINC headquarters, supporting and supported CINCs, subordinate unified commands, Department of Defense (DoD) and non-DoD agencies, non-government organizations, and coalition partners. CINC 21 addresses the need for CINCs and CJTFs to operate in this complex world environment by exploiting the power of visualization to convey knowledge and understanding.

In addition to traditional military operations, the 21st century environment makes it necessary to participate in a wide variety of theater engagement activities. These mission areas, sometimes known as Military Operations-Other-Than-War (MOOTW), include refugee control, humanitarian assistance, disaster relief, non-combatant evacuation, public security/law and order, support to host governments, mediation/negotiations, and demilitarization operations. All these operations put a premium on open-source/unclassified information that can be readily shared with all participants.

The desired outcome for this environment is threefold: (1) the necessary mature and maturing tools will be integrated to enable open-source information to be added to the information-gathering systems available to the USPACOM virtual staff, (2) the information will be compatible with decision-support software tools that enable assessment, evaluation, and prioritization of appropriate courses of action (COAs), and (3) the open-source information should be accessible from a mobile or remote command site/"cell."

As Figure 1 shows, CINC 21 will provide a highly visual, dynamically updated capability to develop and understand the CINC's theater situation, plans, and execution status during multiple, simultaneous crises involving joint, coalition, and humanitarian agencies based on shared knowledge and collaboration across secure and optimized networks.

CINC 21 will provide the following capabilities:

- User-tailorable, integrated situation display
- Enhanced visualization of information so decision-makers can quickly interpret, assimilate, and act
- Secure access to relevant information at its source on demand (demand can be from user or intelligent agent)
- Distributed collaborative environment enabling rapid command and control and access to expertise at its source—collaboration as a basic service
- Enhanced security by providing capability to establish trusted network relationships on demand
- Information flow monitoring and dynamic allocation of resources to optimize distribution of information based on commanders' priorities

Technical Approach

CINC 21 seeks to provide an enhanced decision support environment for the CINC and its extended staff through mature commercial and government software packages. The objectives of the CINC 21 ACTD can be mapped into the four technical areas listed in Table 3.

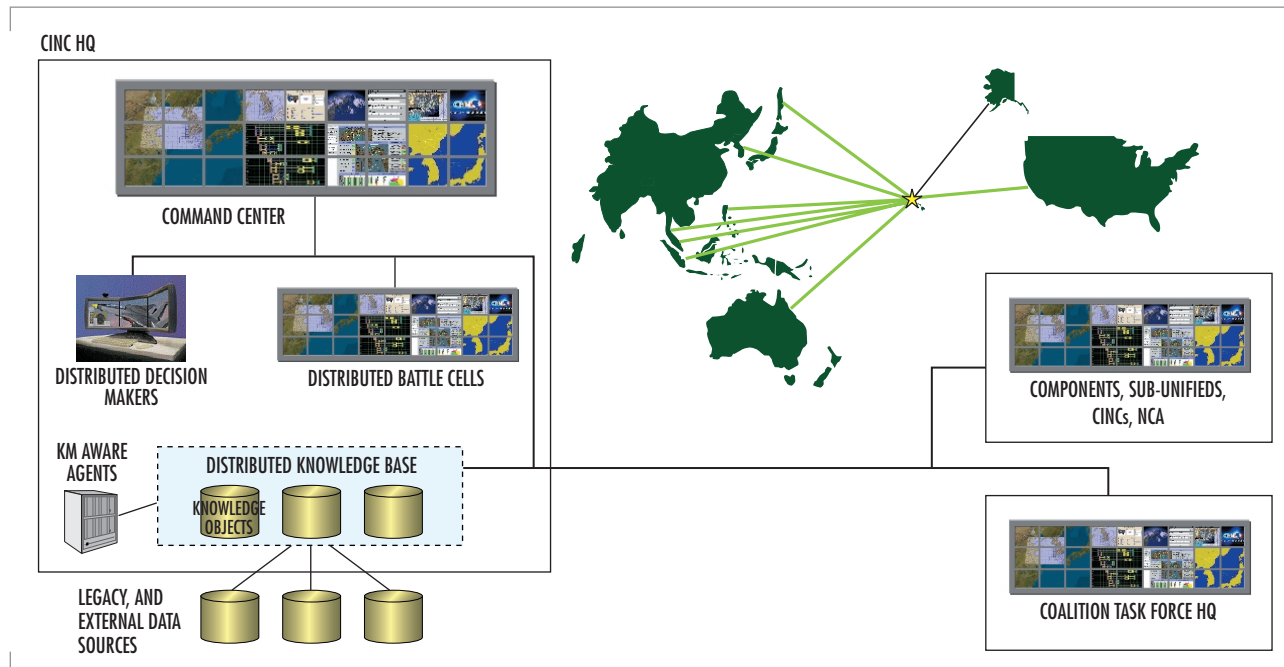


FIGURE 1. CINC 21 operational concept.

System Design, Engineering, and Integration

The CINC 21 responsibility for system design, engineering, and integration is assigned to the System Development Team led by Ray Glass (SSC San Diego). This team is responsible for all development activities leading up to the hand-off of a robust, configuration-managed hardware/software solution to the CINC 21 Implementation Team, led by Tom Tiernan, SSC San Diego.

The breakdown of the CINC 21 development activities into the four areas has been done to carefully split the responsibilities of the Development Team so that they can concentrate more fully on their primary objectives. Designers of the general framework services will not be inclined to shortcuts because of pressure in delivering specific operational packages. Operational package developers will be freed from the responsibilities of building and maintaining the core services. Integration, test, and configuration management has been separated from both activities to ensure unbiased independent verification and validation (IV&V). Finally, the operational support activity has been called out separately to

TABLE 3. CINC 21 technical areas.

Technical Area	Description
Data interoperability (information management, knowledge management, network infrastructure)	Provide improved mechanisms for sharing information across the CINC's staff and to enable more effective and efficient production of cross-staff decision products.
Information infrastructure enhancements (information management, knowledge management)	Provide upgrades to the CINC's information infrastructure that improve decision-making, foster greater inter-agency and coalition interaction, and improve security.
Knowledge wall environment (visualization)	Provide a structured environment that allows the rapid development and easy sharing of a wide range of correlation, visualization, and collaboration services. As an adjunct to this activity, CINC 21 will pursue the delivery of multi-panel desktop and wall-based displays as residual capabilities.
Operational packages (knowledge management)	Develop specific operational capabilities for USPACOM and United States Strategic Command (USSTRATCOM) by using a complete set of Extensible Markup Language (XML), Decision Tagged Data (DTD), databases, correlation, and visualization plug-ins to create useful end-to-end services.

ensure that support to the Implementation Team does not have a resource impact on other system development activities.

To ensure a common foundation for all three classes of CINC 21 users, the system development activity will be divided into three parts: a system design effort that will design and develop the user-independent CINC 21 foundation, an operational package development and operational support activity effort that will provide domain-specific products to operational users, and an implementation management effort responsible for integrating the operational packages into operational use. Figure 2 shows the system development approach.

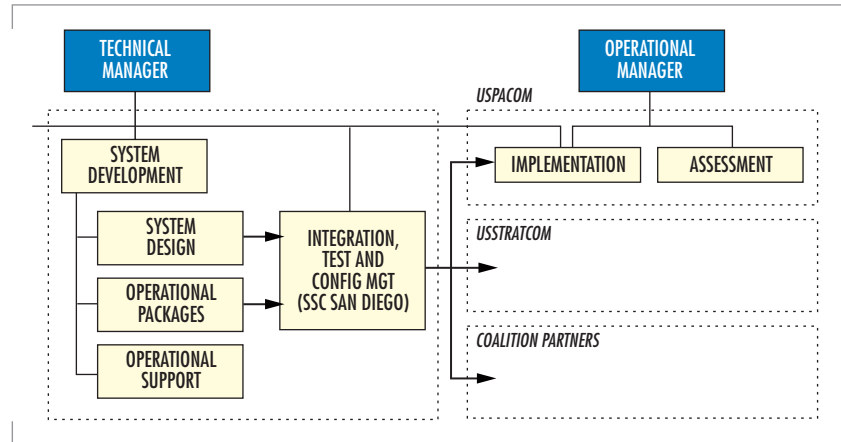


FIGURE 2. System development approach.

CONCLUSION

As stated in the introduction to this paper, CINC 21's objective is to increase the speed of command across the spectrum of operations by controlling and exploiting an information-rich environment. This objective demands advanced technologies linked to advanced concepts. Within CINC 21, we are exploring concepts and technologies that not only improve the ability to collect, process, and disseminate information, but also fundamentally change the way warfighters use that information by applying tools and processes that create knowledge and understanding. Today, we drown people in information, but leave them starving for knowledge. With CINC 21, we will show how we can significantly improve the ability to command and control forces by providing a more visual, structured, and interactive command environment.

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